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## UNIT COSTS AS A GUIDING FACTOR IN BUYING OPERATIONS

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There is a prevalent notion, chiefly among accountants and business men, that the primary function of a cost-accounting system, say in a manufacturing establishment, is to enable the manufacturer to arrive intelligently at an asking price for his products. According to this notion, which is entertained also by a few economists, the manufacturer determines his minimum asking price merely by adding together the cost of his raw material and the expenses incurred in converting the raw material into a finished product. The better his system of cost accounts, the greater the likelihood that his business will be conducted along profitable lines because unit costs are, or should be, the *guiding* factor in his selling operations.

In a recent number of this *Journal*, the writer expressed an entirely different point of view as to the function of cost accounting in the *meat-packing* industry, and stated, without attempting to develop the point, that "It [the packer's cost-accounting system] is the guiding factor in his buying operations."<sup>1</sup> This statement aroused a good deal of criticism from the accounting fraternity, and the question was asked, "Is not the packer's cost-accounting system a guiding factor in his selling operations?"

The purpose of the present article is to show that the packer's cost-accounting system performs one of its chief functions in indicating the maximum price that can profitably be paid for live stock rather than in determining the minimum asking price at which meat and by-products will be offered; and, incidentally, that a system of cost accounts performs essentially the same function in many other industries.

It is unquestionably true that unit costs are a factor in the packer's selling operations. The cost of every product is carefully

<sup>1</sup> "Joint Cost in the Packing Industry," *Journal of Political Economy*, XXIX, No. 4 (April, 1921), 297.

determined and, in most cases, the sales manager who is responsible for the disposition of a particular product knows its manufacturing and distributing cost. But there is no necessary relation between this cost and the price finally paid by the retailer. In a deficiency market or during a period of rapidly rising prices, the price paid by the retailer may be above cost, while in periods of falling prices or in markets where the consumptive demand has been overestimated, the price may be substantially below. About the only real service which a cost figure renders in this connection is that its possession has a wholesome effect upon the selling agencies—it urges them to put forth greater effort in “pushing” their products, especially when losses are imminent, with the result that losses for the time being may be prevented or at any rate considerably reduced.

There are at least two important reasons why a packer cannot expect to market his products on a strictly cost basis. In the first place, the greater portion of his products consists of perishable meats which must be moved promptly into consumptive channels. Fresh beef, for instance, must be in the hands of the retailer within two weeks at most after the animals are killed; otherwise it will deteriorate in quality and the trade will discriminate against it. The case would be entirely different if the packer could freeze and hold beef carcasses from one season to another, thereby avoiding forced sales. But the consuming public insists on having fresh chilled beef, with the result that only about 5 per cent of the beef dressed in packing plants is put through the freezing process. The quantity of beef that is cured and canned is even smaller.

In the second place, the demand for meat is exceedingly variable. While the total consumptive demand depends primarily upon the relation of meat prices to the prices of other kinds of food, it is affected also by the Lenten season, Jewish holidays, changes in the weather, and general industrial conditions. Some of these factors can be anticipated with reasonable accuracy by the packer on the basis of his past dealings. But when it comes to anticipating the fluctuations in the total demand for meat in specific communities, fluctuations in the particular kinds of meat required, and the volume of meat products that will be supplied in particular sections

of the country by competing concerns, it will readily be seen how impossible it would be for any packer, even during a period of normal business conditions, to market his products on a strictly cost basis. He must be governed in his selling operations by market conditions essentially, rather than by cost considerations.

The effect which price changes have on the general consumptive demand is best shown by a comparison of cattle receipts and wholesale beef prices. The receipts of cattle at the primary markets are subject to wide seasonal fluctuation. During the fall months—after the grass season is over and the corn crop has been harvested—receipts are greater than at any other time of the year, while in the period from February to June inclusive, receipts are normally small. Since the supply of beef in the hands of the packer is dependent on the number of beef cattle shipped to market, and since only a small quantity of beef can be stored, it follows that more beef must be consumed in the fall than in the spring; also, that the price must be low during the period of large receipts and high during the period of small receipts in order to adjust the consumptive demand to the existing supply.

In estimating the part which the packer's cost-accounting system plays in this adjustment process, it is to be noted first of all that the demand for live stock is derived from the demand for live-stock products, and that the price which the packer can afford to bid for live animals obviously depends upon the price that he can get for meat and by-products less his expenses of manufacture and distribution. When retailers, prompted by the urgent demands of their customers, are willing to pay higher prices for meats, the packer tries to increase the volume of his business in order to realize as large a profit as possible from his operations. And since he can increase the volume of his business only by buying a larger number of live animals in the open market, competition with other buyers forces up the price of live stock.

Likewise, when changed conditions of demand or of supply cause a decline in the wholesale price of meat, the packer may be compelled to reduce the volume of his purchases or operate at a loss. In any case, it is obvious that he cannot afford to bid at the same rate for live stock as before; and since the majority of other

packers are confronted by the same conditions, live-stock prices fall. Not infrequently, however, a considerable period of time elapses before the balance between the price of live stock and the price of live-stock products is restored. Naturally, a packer hesitates to reduce abruptly his volume of business, and thereby increase his unit costs of operation, especially when there is any likelihood that some competitor will be in a position to absorb a part of his regular trade. His plants must be kept in operation, and the requirements of his regular trade must be supplied. Furthermore, it is always necessary to compete with concerns which, on account of faulty cost-finding methods, conduct their buying operations less intelligently. For one reason or another, on a falling market, a packer may be forced for weeks at a time to bid more for live stock than the market price of his products less the expenses of operation.

Another point to be noted in this connection is that unit costs vary according to the quality of live stock purchased. In the case of cattle, for instance, the weight of a dressed carcass varies all the way from 45 to 65 per cent of the live weight. Other things being equal, the greater the percentage of dressed weight that can be obtained from a steer, the lower will be the cost per pound of beef.<sup>1</sup>

It is manifestly impossible for a live-stock buyer to know in advance the actual cost of the meat that will be obtained from a given purchase. But an experienced buyer is an expert in estimating dressing percentages; and, knowing from current operations the dressed cost of similar lots of live stock, he is able to determine with a remarkable degree of accuracy the dressed cost that will result from a given purchase price. Knowing also how live-stock products of a definite quality are selling in the various wholesale markets, he tries to buy live animals at a price that will yield a profit when they are disposed of in the form of meat and by-products. The buyer subsequently learns from the accounting department whether on the basis of existing values the purchase was successfully made.

<sup>1</sup> For the method used in calculating the cost of dressed beef see the article "Joint Cost in the Packing Industry," *loc. cit.*, p. 297.

Thus the calculation of dressed-cost figures serves not only as a guide in determining the maximum price that can profitably be offered for live stock, and the quantity that should be purchased, but also as a check on the efficiency of the live-stock buyer. The result of this unit cost service is that live-stock prices follow fairly closely in line with the prices obtaining for live-stock products, and

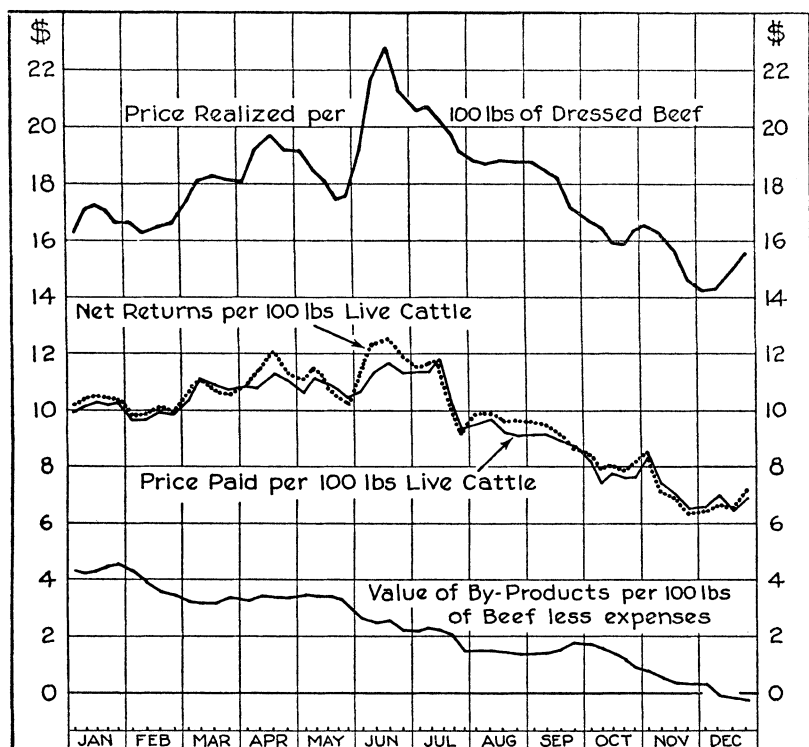


CHART 1.—Weekly results of the cattle operations of Swift & Company, 1920

the margin between buying and selling price is normally sufficient to cover the expenses of operation and yield a return on invested capital.

The accompanying chart shows—with some qualifications to be dealt with later—the weekly financial results for the year 1920 of the cattle operations of the company with which the writer is connected. As a means of comparing live-stock prices with the

prices of live-stock products so as to show the weekly margins of profit or loss, the sale price<sup>1</sup> actually realized per hundred-weight of dressed beef has been reduced to a live basis by taking into account the dressing percentage of each lot of cattle purchased. To these figures have been added the value of hides and other by-products per hundredweight of beef (reduced to a live basis in the same manner) at the time of slaughter, less all manufacturing and distributing expenses except interest. These combined results are indicated on the chart by the broken line which corresponds closely to the solid line showing the prices paid for live cattle. Where the broken line is above the solid line, the difference between the two lines represents the margin of profit for that week; where it is below, it represents a loss.

It should not be inferred that the weekly margin of profit or loss, as revealed in the chart, is available at the end of each week. Before the margin on a particular week's operations can be determined, all the beef dressed during that week must be sold, and beef cannot be sold immediately after the animals have been slaughtered. It must be chilled for 36-48 hours before it can be shipped, and it may be in transit several days before it reaches the packer's branch house where it is sold to the retailer. Normally a period of two weeks or more must elapse before the margin on a particular week's operations can be finally determined.

Attention should also be called to the fact that, since the weekly margins of profit and loss are found by deducting the cost of live animals plus operating expenses from the proceeds of beef sales plus the net value of by-products at the time of slaughter, they cannot be regarded as profits or losses actually realized. They are calculated before by-products have been processed and sold, and therefore may have little bearing on the profit-and-loss statement covering the year's operations.

There is good reason for combining unrealized by-product values with prices actually realized for beef, in arriving at the

<sup>1</sup> The price of dressed beef as shown for any one week in the chart is the average of prices finally realized for all beef dressed during that particular week, irrespective of the time when the beef was actually sold. The price paid for live cattle and the value of by-products (less expenses) are an average of the prices and values, respectively, obtaining in the weeks as shown.

profit-and-loss margin, even though this procedure appears to be inconsistent. In the first place, by-products are of much less importance than beef in cattle operations and, under ordinary conditions, they are not likely to appreciate or depreciate materially in value from day to day or from month to month as does beef. The fundamental reason, however, is that it would be inexpedient to wait until all by-products had been disposed of before calculating the margin of profit, because by-products move slowly into trade channels, much more slowly than beef. It requires two weeks, for instance, to convert edible fats into oleo oil, not to mention the time required to sell the finished product. Hides, the most important by-product of beef, cannot be cured in less than thirty days, and it may be two or three months before a sufficient number of cured hides of a particular grade has been accumulated to meet the requirements of a buyer. Under these conditions, if the cost figures are to be of any use either in buying cattle or in selling beef, the packer is virtually compelled to calculate his current profit-and-loss margins on the basis of unrealized by-product values—or, what amounts to the same thing, to calculate his dressed-beef costs on the basis of existing by-product values—and assume the risk of fluctuation in those values.

This method of procedure proved to be unfortunate for the packer during the year 1920, on account of the tremendous decline in by-product values. At the beginning of the year, the net value of the by-products from a 1,000-pound steer amounted to about \$28; by the end of the year the same products had a net value of only \$7, or less than sufficient to cover the expenses of handling the animal through the packing-house and branch-house organization. The steady fall in the value of these raw products during the period they were in the process of cure or manufacture made it wholly impossible to realize the tentative margins of profit shown in the chart above. As a matter of fact, the average loss per head on cattle operations for the calendar year was 22 cents, and the total loss, \$495,125.

One other matter growing out of the fall in by-product values remains to be noted. Reference to the chart shows clearly that with the fall in by-product values, the spread between the price



of beef and live cattle per 100 pounds became substantially wider. At the beginning of the year the price of beef per pound was about 160 per cent of the live price, while at the end of the year the percentage had increased to more than 200. This change in the relationship of cattle to beef prices at once suggests the question, What effect did the fall in by-product values have upon the wholesale price of beef? Did it result in making beef prices higher than they would have been otherwise, or did it have no effect of any consequence?

It would be contended by some of those to whom this article is addressed that the fall in by-product values automatically and immediately raised beef prices. Their argument would go somewhat as follows: The prices asked for beef and by-products together must be high enough to cover the cost of live cattle, plus the expenses of operation. If the value of by-products falls, the cost of the beef rises accordingly, and the packer must get more for his beef in order to come out even.

The fallacies in this argument are at once apparent. If it were possible to raise the price of a perishable product like beef, simply because by-products had fallen in value, and at the same time move the whole supply into consumptive channels, it would likewise be possible to prevent the value of by-products from falling below cost. The main fallacy, of course, lies in the assumption that the price of live-stock products depends upon live-stock prices. The causal relationship is just the reverse. A decline of \$1 in the value of the hides and other by-products per 100 pounds of live cattle will *cause* a corresponding decline in the price of live cattle—assuming that operating costs and the demand for beef remain unchanged—and widen the spread between cattle and beef prices. Likewise, a rise in the values of by-products will cause an increase in the price of live cattle by a corresponding amount, and narrow the spread between cattle and dressed-beef prices.

Obviously, it is the price of cattle, rather than the price of beef, that is immediately affected by a fall in by-product values. The price of beef could not rise in this case except through a diminution in the number of cattle shipped to market, and since cattle already produced must be sold whether the price is high or low, it follows

that a slight fall in cattle prices could have no appreciable effect, for the time being, in diminishing the supply of beef or in raising beef prices.

There is no denying the fact, however, that a steady decline in by-product values will sooner or later affect the price of beef by reducing the supply. Declining cattle prices will ultimately curtail cattle production; and even before there has been an actual reduction in the number of cattle produced, many of the cattle being prepared for shipment will be marketed before they are properly finished. In either case the supply of beef will be diminished and, other things being equal, beef prices will be higher than they would have been had not the value of by-products fallen.<sup>1</sup>

A somewhat similar conclusion, in so far as it concerns the long-time effect upon beef prices, would be reached by those who contend that unit costs are a guiding factor in selling operations. But they would reach this conclusion more by accident than through a process of careful reasoning. In contending, as they do, that unit costs determine the manufacturer's minimum asking price, they completely overlook the subtle but fundamental fact that the price paid by an intelligent enterpriser for raw material is dependent first of all upon his unit costs of operation and the price at which he thinks he can sell his finished products; therefore, the guiding service which unit costs may *appear* to render in enabling the manufacturer to determine or to realize his minimum asking price is merely one of repetition—it is a service which was previously rendered in the buying operation.

It is not alone in the packing industry that buying prices are largely governed by selling prices and unit-cost considerations. Throughout the whole field of business activity may be seen the effect of cost calculations upon buying operations, especially in

<sup>1</sup> It is impossible to determine just how long a period of time would be required to bring about this result. The question cannot be answered by a study of live-stock receipts and prices in the primary market because (1) not all of the receipts are purchased by packers, and (2) there are wide variations in the demand for beef, in the live weight of cattle slaughtered and in dressed yields. Under these conditions, the statistics of receipts do not afford a dependable barometer of the forthcoming beef supply or of beef prices.

periods of rapid price changes when the effect is the most conspicuous. It is a familiar fact that during such periods wholesale prices rise or fall more rapidly than retail prices, and raw material prices more rapidly than the prices of manufactured articles. At each stage in the marketing chain from producer to consumer, the percentage of price change is greater than in the stage immediately following.

The retail price of bread, for instance, declined 3.5 per cent in Chicago during the year ending April 15, 1921.<sup>1</sup> During the same period and in the same market, the retail price of flour declined 33.8 per cent,<sup>2</sup> the wholesale price of flour declined 43 per cent,<sup>3</sup> and the price of wheat 51 per cent.<sup>4</sup> The price of hogs declined 44.2 per cent<sup>5</sup> and of corn, 67.2 per cent.<sup>6</sup> It is interesting also to observe that on the farm, seeds declined more than hay, and hay more than horses and other live stock.<sup>7</sup> Such cases might be multiplied indefinitely.

The explanation of these peculiar price relationships is fundamentally a matter of unit-cost considerations. When a fall in consumers' prices is under way, each of the various middlemen in the marketing chain is confronted with the prospect that by the time his service—whether manufacturing, distributing, etc.—has been performed, his selling price will have fallen. He will, therefore, reduce the volume of his purchases. Whether or not he succeeds in adjusting his buying prices down to a level where he can continue to sell at a profit, depends largely upon the opinions of his competitors as to the probable course of selling prices. But he will at least get his buying prices in line with present selling prices i.e., he will take account of his unit costs of operation in buying raw or finished products for resale. If, in the meantime, the fall in the price at which he sells is not accompanied by a proportionate decline in his unit costs of operation—and this is invariably the

<sup>1</sup> *Monthly Labor Review*, XII, No. 6 (June, 1921), p. 20.

<sup>2</sup> *Ibid.*

<sup>3</sup> *Daily Trade Bulletin*.

<sup>4</sup> No. 2 or better, *Price Current Grain Reporter*.

<sup>5</sup> *Chicago Drovers' Journal*.

<sup>6</sup> No. 2 or better, *Price Current Grain Reporter*.

<sup>7</sup> *Monthly Crop Reporter*, May, 1921, p. 59.

case in the early stages of falling prices on account of the relative inflexibility of such expenses as wages, rents, interests, taxes, etc.—the percentage decline in his buying prices will necessarily exceed the percentage decline in his selling prices.<sup>1</sup>

The effect of constant unit costs of operation upon relative price declines becomes much more conspicuous when the costs of all the services performed between producer and consumer are combined and comparisons are made between consumers' and producers' prices. Suppose, for example, that consumers have been paying \$100 for certain finished products which have been manufactured and distributed to them at a cost of \$50, making the price of the raw material about \$50. Now, if the consumers' price falls 25 per cent (\$25) while the cost of manufacture and distribution remains the same, the price of the raw material must fall to \$25, which is a reduction of 50 per cent. If, under the same conditions, the consumers' price had fallen 10 per cent, the price of raw material would have fallen 20 per cent. The wider the spread between producers' and consumers' prices, the greater will be the relative decline in producers' prices.

In the face of steadily falling retail prices and fairly constant unit costs of operation, wholesale prices have been falling rapidly during the past year—out of all proportion in fact to the fall in consumers' prices—while raw material prices have fallen more rapidly than wholesale prices. And, in a sense, the burden of these high operating costs has fallen chiefly upon the producers of basic commodities rather than on the consumers of finished products. That is to say, enterprisers have not added the expenses of manufacture and distribution to the prices paid for raw materials to determine consumers' prices but, on the contrary, they have deducted their unit costs of operation from consumers' prices to determine the amount that could be paid to the producers of raw material.

The part played by unit operating costs in periods of rising prices is substantially the same, although the effect produced is

<sup>1</sup> For a somewhat different explanation of the part played by operating costs in causing dissimilar price fluctuations see Professor Wesley Mitchell's *Business Cycles*, pp. 461-62 and 559.

the opposite. During the period of business depression, which normally fills the interval between periods of falling and rising prices, unit costs of operation are substantially reduced. A balance is finally reached between labor cost, capital cost, raw material and consumers' prices where business revival becomes possible. In the upward trend of prices which follows, unit costs of operation again tend to remain fairly constant. They are not immediately affected by the rise in commodity prices. The result is that wholesale prices rise more rapidly than retail, and raw material prices more rapidly than wholesale.

Thus, at each step in the marketing chain from producer to consumer, buying prices are governed chiefly by unit-cost considerations and prospective selling prices, no less when the general price level is rising than when it is falling. And although the operation of this principle inflicts relatively heavy losses upon the producers of raw material during a period of falling prices, these losses are counterbalanced, in part at least, by the relatively large gains which accrue to them with the return of business prosperity. This point is generally overlooked, or ignored, by those who subscribe to the popular doctrine that producers in general are entitled to cost plus a fair profit for their services.

The writer would be the last to proclaim that unit costs are not a factor in selling operations. It is admitted, even in the case of perishable meat products, that they are a factor in the asking price and sometimes in the price realized. It is also admitted that one who has expended money in the purchase of a share of stock, a bond, or any non-perishable product, will naturally be reluctant to dispose of his possessions for less than cost; and that reluctance on the part of a great many sellers to sell below cost might, for a short period of time, tend to sustain prices.

But these are not the points at issue. The fundamental point for which the writer contends is that in the case of both perishable and non-perishable products, unit costs, although *appearing* to guide the seller, perform their *real* guiding function at the time goods are purchased for resale. Any service which they subsequently render is in the nature of reminding the seller of the price at which he originally expected to sell, with the result that he may put forth greater sales effort in trying to realize this price.

It does not follow, however, that sellers will realize the prices they anticipate—witness the losses occasioned by the recent price decline—even though the product in question is non-perishable. For, after all, unit costs do not *determine* prices. While it happens to be true, according to current economic philosophy, that the price of a finished product tends to be equal to marginal cost—i.e., the cost of the raw material entering into the product plus the unit costs of operation in the most inefficient firms—the real chain of causation is not from the price of the raw material through costs of manufacture and distribution to final consumers' price. It is exactly the reverse. It is human desire that leads to human effort, demand that leads to supply, and therefore present and prospective consumers' prices that lead to producers' prices.<sup>1</sup>

Recognition of these fundamentals would go a long way toward counteracting the pernicious doctrine, inherited from the war, that farmers and other business men are *entitled* to cost plus a fair profit for their services; it would contribute in no small degree to a better understanding on the part of producers and consumers of their economic relations to one another; and, finally, it might lead to a thorough-going revision of some of the current methods of approach to the study of marketing principles.

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<sup>1</sup> There can be no objection to reasoning from producers' supply (i.e., the quantity produced) to consumers' supply over long periods of time. In fact, consumers' supply is absolutely dependent upon producers' supply, but producers' prices are dependent on consumers' prices. Suppose, by way of illustration, that corn is used solely for the production of meat, and that corn prices are so low as to discourage corn production. If this condition continues, the production of corn, and therefore the supply of meat, will be diminished. The price of meat, and therefore the price of corn, will rise until corn production and meat consumption again reach an equilibrium. In other words, although consumers' supply is dependent upon the quantity produced, it still remains true that producers' prices are dependent on consumers' prices.

The fact that corn may be used for other purposes than meat production in no way invalidates these principles of price relationship. It merely emphasizes the dependence of producers' prices upon the final prices received for *all* the finished products manufactured from the raw material in question.